

REMARKS

Claims 12-14 are pending in the application upon entry of this amendment. Claims 1-11 have been canceled, and new claims 12-14 have been submitted. Support for new claims 12-14 may be found in the application at least at paragraphs [0092-0097], and Figs. 7, 11, and 12.

Favorable reconsideration of the application is respectfully requested in view of the amendments and following remarks.

I. AMENDMENTS TO THE DRAWINGS

The Examiner objects to Figs. 4 and 15(b) as containing improper labels. In addition, Applicants have identified certain mislabeling errors in Fig. 7. Appropriate corrections have been made, and replacement sheets containing amended Figs. 4, 7, and 15(b) are being submitted herewith. The objections, therefore, should be withdrawn.

II. CLAIM REJECTIONS – 35 U.S.C. § 112

Canceled claims 1, 4, and 6-11 were rejected pursuant to 35 U.S.C. § 112, second paragraph, as being indefinite. These rejections are moot in view of the cancelation of the rejected claims. In addition, Applicants submit that new claims 12-14 meet the requirements of 35 U.S.C. § 112, second paragraph. The rejections, therefore, should be withdrawn.

In addition, Applicants submit that the “means for” elements of new claims 12 and 13 are recited in proper means-plus-function format pursuant to 35 U.S.C. § 112, sixth paragraph. In accordance with the Examiner’s comments regarding the previous claims, claims 12 and 13 include the phrase “means for” modified by functional language: *i.e.*, mean for controlling; means for stopping. In addition, the claim limitations do not recite sufficient structure, material, or acts that would preclude application of 35 U.S.C. § 112, sixth paragraph.

III. OVERVIEW OF THE CLAIMED INVENTION

The present invention is a working robot suitable for automatically performing work on a floor surface. The working robot can detect an obstacle and, based on such detection, adjust the position of a working assembly to avoid the obstacle. Claims 12-14 exemplify an embodiment described in the Application at least at paragraphs [0092-0097] and Figs. 7, 11, and 12.

In particular, the claimed invention includes at least one **"first contact sensor"** for detecting the contact of an obstacle with a **front surface** of a working assembly. In response to such contact, a control means causes the working assembly to move left and right at a **first retraction speed**. The Application states:

As shown in FIG. 11(a), if the front surface of the front left bumper 21L contacts the obstacle W, the CPU 46 receives a detection signal from the first left detection switch SL1 (FIG. 7), and moves the working assembly 2 to the right at the first retraction speed A1.

As shown in FIG. 11(b), if the front surface of the front right bumper 21R contacts the obstacle W, the CPU 46 receives a detection signal from the first right detection switch SR1 (FIG. 7), and moves the working assembly 2 to the left at the first retraction speed A1."

(Application, page 41, paragraph [0093] and Figs. 11(a) and (b).)

In addition, the claimed invention includes at least one **"second contact sensor"** for detecting the contact of an obstacle with a **side surface** of a working assembly. In response to such contact, a control means causes the working assembly to move left and right at a **second retraction speed** that is lower than the first retraction speed. The Application states:

As shown in FIG. 11(c), if the left side surface of the front left bumper 21L contacts the obstacle W, the CPU 46 receives a detection signal from the second detection switch SL2 (FIG. 7), and moves the working assembly 2 to the right at the second retraction speed A2, which is lower than the first retraction speed A1.

As shown in FIG. 11(d), if the right side surface of the front right bumper 21R contacts the obstacle W, the CPU 46 receives a detection signal from the second right detection switch SR2 (FIG. 7), and moves the working assembly 2 to the left at the second retraction speed A2.

The first retraction speed A1 is preferably about 1 m/sec to 3 m/sec, for example. The second retraction speed A2 is preferably about 10 cm/sec to 30 cm/sec, for example.

(Application, page 41, paragraph [0094] and Figs. 11(c) and (d).)

The above features, including front surface detectors causing retraction at a first retraction speed and side surface detectors causing retraction at a second slower retraction speed, provide for enhanced working around an obstacle. Fig. 12 describes an exemplary operation of such features:

In the comparative example of FIG. 12(b), when the side surface of the front right bumper **21R** contacts the obstacle **W**, the working assembly **2** is moved quickly at the first retraction speed A1 ((1) in FIG. 12(b)). Therefore, in this comparative example, the working assembly **2** comes too far away from the obstacle **W**, and the amount of time for which the obstacle **W** and the working assembly **2** are away from each other is increased ((1) to (3) in FIG. 12(b)). In contrast, in the present embodiment, when the side surface of the working assembly **2** contacts the obstacle **W**, the working assembly **2** is moved at the second, lower, retraction speed A2. Therefore, the amount of time for which the working assembly **2** and the obstacle **W** are away from each other is decreased, whereby the robot can do cleaning near the wall along the obstacle **W**.

(Application, page 43, paragraph [0097] and FIG 12(b).)

In accordance with the above, new independent claim 12 recites in part:

a first contact sensor provided in the working assembly for detecting a contact of the obstacle with a front surface of the working assembly;

a second contact sensor provided in the working assembly for detecting a contact of the obstacle with a side surface of the working assembly; and

means for controlling a travel of the traveling assembly, for controlling the moving mechanism to move the working assembly left and right at a first retraction speed based on a detection signal from the first contact sensor, and for controlling the moving mechanism to move the working assembly left and right at a second retraction speed, being lower than the first retraction speed, based on a detection signal from the second contact sensor.

As explained below, the references cited by the Examiner, whether considered individually or in combination, do not disclose or suggest such features.

IV. REJECTION OF CLAIMS UNDER 35 U.S.C. § 103(a)

Applicants note that new claims 12-14 have certain features in common with previous claims 8-10. Previous claims 8-10 were rejected pursuant to 35 U.S.C. § 103(a) as being obvious over the combination Hwang, U.S. Patent No. 5,568,589 (Hwang), Jeong, U.S. Patent No. 5,896,488 (Jeong), and Kawakami, U.S. Patent No. 5,903,124 (Kawakami). The Examiner recognizes Hwang and Jeong do not disclose or suggest features associated with a moving mechanism for moving the work assembly relative to the traveling assembly. The Examiner, however, asserts Kawakami discloses such features. Applicants disagree with the Examiner's application of the references, particularly as to the relevance of Kawakami.

The Examiner cites to col. 5, lines 48-64 and Figs. 1, 5, and 7a-g as allegedly disclosing the pertinent features of the claimed invention. The device of Kawakami appears to have a plurality of micro-switches 7a-g, which the Examiner equates to the claimed sensors, which cause a change in the positional relationship between an outer cover 1 and a cleaning unit base plate 99 via a "connecting portion 95". The Examiner appears to equate the connecting portion 95 with the claimed moving mechanism for moving a purported working assembly (cleaning unit base plate 99) relative to a purported traveling assembly (outer cover 1).

Even if the Examiner's interpretation is assumed correct in the above regard, Kawakami still does not disclose or suggest the additional claim features by which the working assembly is moved at a first retraction speed based on a detection signal from the first contact sensor, and at a second retraction speed, being lower than the first retraction speed, based on a detection signal from the second contact sensor. Kawakami does not disclose or suggest that the movement of the base plate 99 differs or is otherwise dependent upon which micro-switch 7a-g senses an obstacle.

For at least these reasons, Kawakami does not make up for the deficiencies of Hwang and Jeong, and, therefore, a combination of the references does not result in,

disclose, or suggest the claimed invention. The rejections, therefore, should be withdrawn.

V. CONCLUSION

For the foregoing reasons, claims 12-14 are believed to be allowable, and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should a petition for an extension of time be necessary for the timely reply to the outstanding Office Action (or if such a petition has been made and an additional extension is necessary), petition is hereby made and the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988, reference number YMMRP0104US.

Respectfully submitted,

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